Amendments to the Claims:

The following listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Withdrawn) An exposure method, comprising:

illuminating a first object with an exposure beam; and

exposing a second object with the exposure beam through the first object and a projection optical system, wherein

at least a part of one of the first object and the projection optical system is irradiated with a light beam having a wavelength range different from that of the exposure beam through a space waveguide mechanism, to correct an imaging characteristic of the projection optical system.

2. (Withdrawn) An exposure method as recited in claim 1, wherein the space waveguide mechanism includes a hollow waveguide made of glass, ceramics, or metal.

3-4. (Canceled)

5. (Previously Presented) An exposure method, comprising:

illuminating a first object with an exposure beam; and

exposing a second object with the exposure beam through the first object and a projection optical system, wherein

a light beam having a wavelength range different from a wavelength range of the exposure beam enters one end of an optical guide,

by a polarization state control mechanism, a polarization state of the light beam which has passed through the optical guide is changed into a linearly-polarized state, and then changed into a predetermined polarized state, and

a part of at least one of the first object and the projection optical system is irradiated with the light beam in the predetermined polarized state to correct an imaging characteristic of the projection optical system.

6. (Previously Presented) An exposure method as recited in claim 5, wherein the optical guide is a hollow fiber.

7. (Previously Presented) An exposure method as recited in claim 5, wherein

the polarization state control mechanism includes a polarization plate, and

the polarization state of the light beam which has passed through the optical guide is changed into the linearly-polarized state by the polarization plate.

8. (Withdrawn) An exposure method as recited in claim 1, wherein

the light beam is generated by an RF excited waveguide type CO_2 laser.

9. (Withdrawn) An exposure method as recited in claim 1, wherein

the at least the part of the one of the first object and the projection optical system is illuminated in a rotationally asymmetric light-quantity distribution with the exposure beam, and

the light beam is applied so as to correct a rotationally asymmetric aberration of the projection optical system generated by the irradiation of the exposure beam.

10. (Withdrawn) An exposure method as recited in claim 9, wherein

a generated amount of the rotationally asymmetric aberration is calculated based on an irradiation amount of the exposure beam, and

the light beam is applied based on the calculated result.

11. (Withdrawn) A device production method, comprising:

transferring a pattern onto a photosensitive element in a lithography process using the exposure method as recited in claim 1.

12. (Withdrawn) An exposure apparatus which illuminates a first object on which a pattern for transfer is formed with an exposure beam and exposes a second object with the exposure beam through the first object and a projection optical system, comprising:

an irradiation mechanism which irradiates at least a part of one of the first object and the projection optical system with a light beam having a wavelength range different from that of the exposure beam, wherein

the irradiation mechanism includes a space waveguide mechanism which guides the light beam along a predetermined optical path.

13. (Withdrawn) An exposure apparatus as recited in claim 12, wherein

the space waveguide mechanism includes a hollow waveguide made of glass, ceramics, or metal.

14-15. (Canceled)

16. (Previously Presented) An exposure apparatus which illuminates a first object on which a pattern for transfer is formed with an exposure beam and exposes a second object with the exposure beam through the first object and a projection optical system, comprising:

an irradiation mechanism which irradiates a part of at least one of the first object and the projection optical system with a light beam having a wavelength range different from a wavelength range of the exposure beam, wherein

the irradiation mechanism includes:

an optical guide into which the light beam enters;

a polarization state control mechanism which changes a polarization state of the light beam which has passed through the optical guide into a linearly-polarized state, and then into a predetermined polarized state, and

a space waveguide mechanism which guides the optical beam in the predetermined polarized state into the part of at least one of the first object and the projection optical system.

17. (Previously Presented) An exposure apparatus as recited in claim 16, wherein the optical guide is a hollow fiber.

18. (Previously Presented) An exposure apparatus as recited in claim 16, wherein the polarization state control mechanism includes a polarization plate, and the polarization state of the light beam which has passed through the optical guide is changed into the linearly-polarized state by the polarization plate.

19. (Withdrawn) An exposure apparatus as recited in claim 12, wherein the irradiation mechanism includes an RF excited waveguide type CO_2 laser as the light source which generates the light beam.

20. (Withdrawn) An exposure apparatus as recited in claim 19, wherein the irradiation mechanism includes a plurality of the RF excited waveguide type CO_2 lasers.

21. (Withdrawn) A exposure apparatus as recited in claim 12, wherein the irradiation mechanism includes a first beam splitter which splits the light beam.

22. (Withdrawn) An exposure apparatus as recited in claim 12, wherein the irradiation mechanism includes at least one of a movable mirror and a shutter in order to time-divide the light beam.

23. (Withdrawn) An exposure apparatus as recited in claim 12, wherein further comprising:

a light source control unit which controls a light emitting duration of a light source which generates the light beam.

24. (Withdrawn) An exposure apparatus as recited in claim 13, wherein

an inner surface of the waveguide is coated with a reflective film including at least one of a metal film and a dielectric film in order to reflect the light beam.

25. (Withdrawn) An exposure apparatus as recited in claim 12, further comprising:

a second beam splitter which divaricates a portion of the lightbeam; and a photoelectric sensor which receives the light divaricated by the second beam splitter, wherein

information on a light quantity of the light beam is obtained with the photoelectric sensor.

26. (Withdrawn) An exposure apparatus as recited in claim 25, further comprising:

at least one polarization element disposed between the light source of the light beam and the second beam splitter.

27. (Withdrawn) An exposure apparatus as recited in claim 25, further comprising:

a 1/4 wavelength plate, disposed between the second beam splitter and an optical member constituting the projection optical system, which sets a polarization state of the light beam to a predetermined state.

28. (Withdrawn) An exposure apparatus as recited in claim 12, wherein

the at least the part of the first object and the projection optical system is illuminated in a rotationally asymmetric light-quantity distribution with the exposure beam, and

the irradiation mechanism applies the light beam so as to correct a rotationally asymmetric aberration of the projection optical system generated by the illumination of the exposure beam.

29. (Withdrawn) An exposure apparatus as recited in claim 28, further comprising:

an aberration correction mechanism which corrects the rotationally symmetric aberration of the projection optical system, and

a control unit which controls operations of the irradiation mechanism and the aberration correction mechanism to correct an aberration of the projection optical system.

30. (Withdrawn) A device production method, comprising:

transferring a pattern onto a photosensitive element in a lithography process using the exposure apparatus as recited in claim 12.

31. (Previously Presented) An exposure method as recited in claim 5, wherein

the polarization state control mechanism includes a polarization prism or a polarization filter which allows only linearly-polarized light polarized in a predetermined direction to pass through, and

the polarization state of the light beam which has passed through the optical guide is changed into the linearly-polarized state by the polarization prism or the polarization filter.

32. (Previously Presented) An exposure method as recited in claim 5, wherein

the polarization state control mechanism includes a phase plate, and

the light beam in the linearly-polarized state is changed into the predetermined polarized state by the phase plate.

33. (Previously Presented) An exposure method as recited in claim 32, wherein

the phase plate is a 1/4 wavelength plate, and

the predetermined polarized state is a circularly-polarized state.

34. (Previously Presented) An exposure method as recited in claim 5, wherein

the light beam whose polarization state has been changed into the linearly-polarized state by the polarization state control mechanism is split into a plurality of light beams,

a part of the plurality of light beams is detected by a photoelectric sensor, and

an irradiation amount of the light beam with which the part of at least one of the first object and the projection optical system is to be irradiated, is controlled based on a signal detected by the photoelectric sensor.

35. (Previously Presented) An exposure method as recited in claim 5, wherein the light beam is generated by an RF excited waveguide type CO_2 laser.

36. (Previously Presented) An exposure method as recited in claim 5, wherein

the part of at least one of the first object and the projection optical system is illuminated in a rotationally asymmetric light-quantity distribution with the exposure beam, and

the light beam is irradiated so as to correct a rotationally asymmetric aberration of the projection optical system generated by the illumination with the exposure beam.

37. (Previously Presented) An exposure method as recited in claim 36, wherein

a generated amount of the rotationally asymmetric aberration is calculated based on an irradiation amount of the exposure beam for the illumination, and

the light beam is irradiated based on the calculated result.

38. (Currently Amended) A device production method ~~including a lithography process, wherein a pattern is transferred~~comprising:

transferring a pattern onto a photosensitive element ~~in the lithography process~~ using the exposure method as recited in claim 5.

39. (Previously Presented) An exposure apparatus as recited in claim 16, wherein

the polarization state control mechanism includes a polarization prism or a polarization filter which allows only linearly-polarized light polarized in a predetermined direction to pass through, and

the polarization state of the light beam which has passed through the optical guide is changed into the linearly-polarized state by the polarization prism or the polarization filter.

40. (Previously Presented) An exposure apparatus as recited in claim 16, wherein

the polarization state control mechanism includes a phase plate, and

the light beam in the linearly-polarized state is changed into the predetermined polarized state by the phase plate.

41. (Previously Presented) An exposure apparatus as recited in claim 40, wherein

the phase plate is a 1/4 wavelength plate, and

the predetermined polarized state is a circularly-polarized state.

42. (Previously Presented) An exposure apparatus as recited in claim 16, wherein the irradiation mechanism includes:

a beam splitter which splits the light beam whose polarization state has been changed into the linearly-polarized state by the polarization state control mechanism into a plurality of light beams;

a photoelectric sensor which detects a part of the plurality of light beams split by the beam splitter; and

a control unit which controls an irradiation amount of the light beam with which the part of at least one of the first object and the projection optical system is to be irradiated, based on a signal detected by the photoelectric sensor.

43. (Previously Presented) An exposure apparatus as recited in claim 16, wherein the irradiation mechanism includes an RF excited waveguide type CO_2 laser as a light source which generates the light beam.

44. (Previously Presented) An exposure apparatus as recited in claim 43, wherein there are a plurality of the RF excited waveguide type CO_2 lasers.

45. (Previously Presented) A exposure apparatus as recited in claim 16, wherein the irradiation mechanism includes:

a first beam splitter which splits the light beam; and

a variable attenuator which continuously controls a transmitted light amount of the light beam split by the first beam splitter and enters the light beam into the optical guide.

46. (Previously Presented) An exposure apparatus as recited in claim 16, wherein the irradiation mechanism includes at least one of a movable mirror and a shutter in order to time-divide the light beam.

47. (Previously Presented) An exposure apparatus as recited in claim 16 further comprising a light source control unit which controls a light emitting duration of a light source which generates the light beam.

48. (Previously Presented) An exposure apparatus as recited in claim 16, wherein the space waveguide mechanism includes a hollow waveguide made of glass, ceramics, or metal.

49. (Previously Presented) An exposure apparatus as recited in claim 48, wherein an inner surface of the hollow waveguide is coated with a reflective film including at least one of a metal film and a dielectric film.

50. (Previously Presented) An exposure apparatus as recited in claim 16, wherein

the part of at least one of the first object and the projection optical system is illuminated in a rotationally asymmetric light-quantity distribution with the exposure beam,

and

the irradiation mechanism irradiates the light beam so as to correct a rotationally asymmetric aberration of the projection optical system generated by the illumination with the exposure beam.

51. (Previously Presented) An exposure apparatus as recited in claim 50 further comprising:

an aberration correction mechanism which corrects the rotationally symmetric aberration of the projection optical system; and

a control unit which controls operations of the irradiation mechanism and the aberration correction mechanism to correct an aberration of the projection optical system.

52. (Currently Amended) A device production method ~~including a lithography process, wherein a pattern is transferred~~comprising:

transferring a pattern onto a photosensitive element ~~in the lithography process~~ using the exposure apparatus as recited in claim 16.